REMARKS

Claims 1-5, 7-10 and 12-19 are currently pending. Claims 6 and 11 have been cancelled. Claims 1, 8, 10 and 16 are currently amended. Claim 1 is amended to better define the invention and support can be found in the specification paragraphs [0017] and [0103]. Claim 8 is amended to correct an informality. Claim 10 is amended to include the limitation of dependent claim 11. Claim 16 is amended to correct the claim dependency.

Claim Rejections - 35 U.S.C. 102

Claims 1-5, 7 and 9 stand rejected under 35 U.S.C. 102(a) as being allegedly anticipated by Jeon ("Neutrophil chemotaxis in linear and complex gradients..."). Jeon was published in July 2002. This application claims priority back to applications filed March 15, 2002. Since the limitations in the current claims were disclosed in these previous applications, the present claims are entitled to a priority date of March 15, 2002. As such, Jeon is not a proper reference.

Even if the date of Jeon was before the Applicant's priority date, Jeon does not disclose all of the limitations of independent claim 1. Jeon teaches using laminar flow to study chemotaxis of neutrophils in a complex gradient of interleukin-8. However, Jeon does not disclose having a leukocyte migration mediator or endothelial cells in the channel. For at least this reason, Applicants submit that Jeon does not anticipate claim 1 (and all claims that depend therefrom) and Applicants request withdrawal of this rejection.

Claim Rejections - 35 U.S.C. 103

Claims 1-3, 6, 7, 9 and 17-19 stand rejected under 35 U.S.C. 103(a) as being allegedly rendered obvious by Harrison (6,632,619) in view of Jarnigan (6,238,874). Neither Harrison or Jarnigan, alone or in combination, teach all of the limitations of claim 1. The Examiner states that Harrison teaches a first fluid stream (inlet flow path 8') having a first concentration of a first substance and a second fluid stream (inlet flow path 8") having a second concentration of a second substance. However, 8' and 8" simply represent two channels in the device of Harrison, and the reference remains silent as to any concentration of the substances in these channels. Thus, Harrison does not create a concentration gradient, as recited in claim 1. Furthermore, the fluid streams in Harrison are in distinctly separate channels and are not adjacent or parallel, as claim 1 recites.

Claim 1 further states that the first fluid stream and the second fluid stream do not mix. However, the inlet flow paths of Harrison are intended to intersect and merge with the main flow path. One inlet path contains the cells of interest and a second inlet flow path contains the compound of interest. The cells and the compound mix at the point where the second flow path enters into the main flow path (col 2, lines 38-49). Therefore, the purpose of the inlet channels of Harrison is for the two substances to mix together and the invention would fail to operate properly if the substances did not mix.

Claim 1 further states that the first well contains leukocytes and the channel contains leukocyte migration mediators or endothelial cells. Harrison broadly describes a method to study leukocyte rolling. However, Harrison does not recite the specific system of claim 1 or any of the method steps of claim 17.

With respect to claim 1, Jarnigan fails to cure the deficiencies of Harrison. Jarnigan discloses a number of sample receiving wells, such as 80, connected to subchamber 92 that receives a chemotactic agent, by capillaries 94. Since 92 is connected to all of the capillaries 94, the concentration of the chemotactic agent in each of the capillaries is the same, and a concentration gradient is only created along the length of the capillaries. Thus, Jarnigan does not have a first fluid stream with a first substance having a first concentration and a second fluid stream with a second substance having a second concentration. Furthermore, if the capillaries are considered as the first fluid stream and the second fluid stream, they do not flow adjacent and parallel to each other without mixing, to create a dynamic concentration gradient, as recited in claim 1.

With respect to claim 17, neither Harrison or Jarnigan, alone or in combination, teach all of the limitations of claim 17. Specifically, the Examiner has failed to address the steps of disposing either a leukocyte migration mediator or endothelial cells in the channel and delivering a sample comprising leukocytes to the channel by laminar flow. As discussed above, Harrison fails to disclose these steps and Jarnigan simply mentions that leukocytes could be used but does not disclose how.

For at least these reasons, Applicants submit that claims 1 and 17 (and all claims that depend therefrom) are not rendered obvious by the combination of Harrison and Jarnigan and Applicants request withdrawal of this rejection.

Claim 8 stands rejected under 35 U.S.C. 103(a) as being allegedly rendered obvious by Harrison in view of Jarnigan in further view of Springer (5,460,945). As discussed above, Harrison does not teach a first and a second fluid stream having different concentrations, and flowing adjacent and parallel to each other without mixing, to create a dynamic concentration gradient, as stated in claim 1 and Jarnigan does not make up for this deficiency. Furthermore, a combination with Springer does not make up for this deficiency. Springer discloses a device and method for monitoring leukocyte rolling, however the device does not disclose the system or method as claimed. Springer's device is meant to placed under a microscope and consists of a glass slide (42) with an inlet (54) and outlet (56) for introducing the blood or leukocytes. This device does not have a channel or two wells and cannot have a plurality of chambers. Furthermore, the device operates by placing a substance onto the slide and then introducing the leukocytes to watch the reaction. This device does not allow for laminar flow of two substances and does not even disclose introducing such substances, as claim 1 (and thus dependent claim 8) states. Furthermore, the device of Springer cannot create a dynamic concentration gradient as claimed. Thus, the combination of Harrison, Jarnigan, and Springer, if possible, would still not teach the device of claim 8. For at least these reasons, Applicants submit that claim 8 is not rendered obvious by the combination of Harrison, Jarnigan and Springer, and Applicants request withdrawal of this rejection.

Claims 4 and 5 stand rejected under 35 U.S.C. 103(a) as being allegedly rendered obvious by Harrison in view of Jarnigan in further view of Jeon (6705357). As discussed above, Harrison and Jarnigan do not disclose all of the limitations of claim 1 and Jeon does not cure this deficiency. Claim 1 (and thus dependent claims 4 and 5) states that the first well contains leukocytes and the channel contains leukocyte migration mediators or endothelial cells. As discussed above, neither Harrison or Jarnigan disclose these limitations. Jeon does not disclose a system for monitoring leukocyte migration and thus fails to disclose leukocytes, endothelial cells or leukocyte migration mediators.

Furthermore, there is no motivation to combine Harrison and Jeon to create a concentration gradient that is perpendicular to the direction of fluid flow. As discussed above, Harrison intends for the converging streams to mix and this is contrary to creating a concentration gradient perpendicular to the flow. The Examiner is using hindsight reasoning to

combine these two references which have the sole similarity of both being microfluidic devices. For at least these reasons, Applicants submit that claims 4 and 5 are not rendered obvious by the combination of Harrison, Jarnigan and Jeon, and Applicants request withdrawal of this rejection.

Claims 10-16 stand rejected under 35 U.S.C. 103(a) as being allegedly rendered obvious by Harrison in view of Jeon (6705357). The Examiner contends that Harrison indicates that fluids moving through the system are characterized by laminar flow, however only the dye in Example III is said to be introduced with a laminar flow to prevent mixing. Other fluids in Harrison are intended to be mixed together, as each inlet path enters the main path. Claim 10 recites the step of passing a test agent over the surface to create a concentration gradient perpendicular to the flow. Although Jeon does describe creating a concentration gradient that is perpendicular to the direction of fluid flow, there is no motivation to combine these two references. For at least these reasons, Applicants submit that claims 10-16 are not rendered obvious by the combination of Harrison and Jeon, and Applicants request withdrawal of this rejection.

Double Patenting Rejection

The Examiner has provisionally rejected claims 1-7, 9-12 and 17 on the grounds of nonstatutory double patenting as being unpatentable over copending Application No. 10/688905 in view of Harrison. As these are provisional double patenting rejections, Applicants request that these rejections be held in abeyance until an indication of allowable subject matter has been made.

CONCLUSION

It is respectfully submitted that the present application is now in condition for allowance, which action is respectfully requested. The Examiner is invited to contact Applicants' representative to discuss any issue that would expedite allowance of the subject application.

Any fees for extension(s) of time or additional fees required in connection with the filing of this response, are hereby petitioned under 37 C.F.R. § 1.136(a), and the Commissioner is authorized to charge any such required fees or to credit any overpayment to Kenyon & Kenyon's Deposit Account No. 11-0600.

Respectfully submitted,

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